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First record of the invasive gecko, *Lepidodactylus lugubris* Duméril & Bibron, 1836 in mainland Chile (Squamata, Gekkonidae)

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Abstract

In Chile, the presence of Mourning Gecko, *Lepidodactylus lugubris* Duméril & Bibron, 1836 has been recognized for Easter Island (Rapa Nui) from late 19th century. Here, we report the first observation of a juvenile specimen of *L. lugubris* in an urban zone of Santiago, Región Metropolitana, mainland Chile, representing the southernmost non-insular record in America for this invasive species. Moreover, an updated distributional map of *L. lugubris* for South America and the Antilles is provided.

Key Words

lizards, Mourning Gecko, new records, non-native species

The Mourning Gecko or Common Smooth-Scaled Gecko *Lepidodactylus lugubris* Duméril & Bibron, 1836 is a small lizard with a great capacity for colonization thanks to parthenogenetic reproduction, synanthropic behaviors, and resistance of its eggs to desiccation and saltwater spray (Cuellar and Kluge 1972; Brown and Duffy 1992; Griffing et al. 2018). This nocturnal species is widely distributed throughout the Indo-Pacific region (Bauer and Henle 1994). It has been detected in Nicaragua, Costa Rica, Panama, Suriname, and the USA (Florida), as well as in more remote locations including the Galapagos Islands and Hawaii (Hoogmoed and Avila 2015). The only islands of the Antilles where this species has been recorded to date are Guadeloupe (Lorvelec et al. 2011; Parmentier et al. 2013, Gomès and Ibéné 2013; Borroto-Páez 2018), the Bahamas (Krysko and MacKenzie-Krysko 2016; Johnson et al. 2018; Giery et al. 2019; Liebgold et al. 2019; Ruhe and Ruhe 2019), Cayman (Goetz and Burton 2018; Liebgold et al. 2019), Turks and Caicos (Ruhe and Ruhe 2019) Cuba (Bosch and Paez 2017; Velazco and González 2019), and Curaçao (Behm et al. 2019). In the last decade, *L. lugubris* has been also reported in new locations in South American countries: Carabobo and Caracas, Venezuela (Guerreiro and Graterol 2012; Señaris et al. 2017), Cauca Valley, Sucre, and Bolivar, Colombia (Daza et al. 2012; Montes et al. 2012; Mendoza et al. 2018), and several new records in Belém and Pará, Brazil (Hoogmoed and Avila 2015).

Although early naturalistic reports mention the presence of lizards on Easter Island (Chile) in the late 19th century, Garman confirms the presence of *Lepidodactylus lugubris* for this locality in 1908. Later, Fuentes (1914) collected the first specimen of this species, describing it

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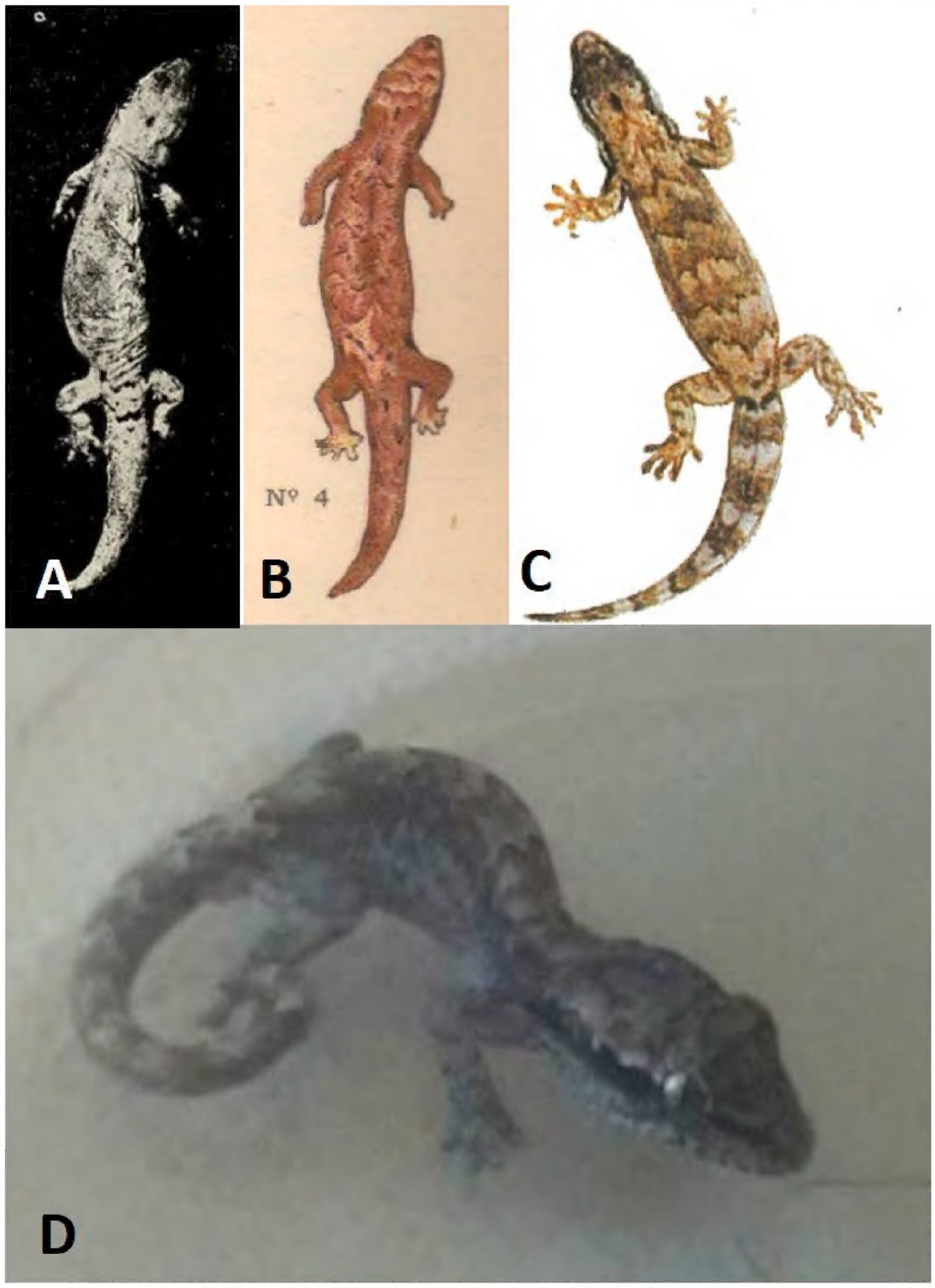

Figure 1. *Lepidodactylus lugubris* reported in Chile. **A** First photography published of a specimen from Easter Island, Chile (Fuentes 1914). **B, C** Color variations in *L. lugubris*. Illustrations by Donoso-Barros (1950), based on Fuentes (1914) and Donoso-Barros (1966). **D** Specimen (SSUC-Re 779) collected in Santiago, Region Metropolitana, mainland Chile.

with light gray coloration and nocturnal activity (Fig. 1A). Subsequently, Donoso-Barros (1950, 1966) presented illustrations of the material collected on Easter Island (Fig. 1B, C). Despite this, the information about this species in Chile is scarce (Pincheira-Donoso 2007). This population is only restricted to Rana-Roraco and Hanga Roa localities in Easter Island (Donoso-Barros 1950; Peters and Donoso-Barros 1970), which probably arrived on the Island in commercial ships (Fuentes 1914). Here, we present the discovery of *L. lugubris*, in mainland Chile.

On April 11, 2018, during fieldwork at Paris-Londres neighborhood (33°26'40.86"S, 70°38'54.27"W), an urban zone of Santiago, Región Metropolitana, Chile, at 10.00 h, we observed a *Lepidodactylus lugubris* specimen at the edge of a wall while some rubble were being removed (Fig. 1D). It escaped to a crack in the wall rock and was then captured. This specimen had an elongated and depressed body, small dorsal scales, depressed pentadactyl limbs, cylindrical and slightly flattened tail, and eyes with vertical pupils. The dorsal coloration was grayish-brown with dark gray transverse bands. All these morphological characteristics were coinciding with those previously described for *L. lugubris* (e.g. Schauenberg 1968; Hoogmoed and Avila-Pires 2015).

The specimen was deposited in the "Colección de Flora y Fauna Profesor Patricio Sánchez Reyes" of the Pontificia Universidad Católica de Chile (SSUC) under the catalog number SSUC-Re 779. Measurements of head length

(HL), snout-vent length (SVL), and tail length (TL) were taken with a Goldtool GMC-190 Digital Vernier Caliper (0.01 mm precision) and the record locations for *L. lugubris* were obtained from the literature (Suppl. material 1: Table S1). Given the limited formal information about the *L. lugubris* population in the Easter Island, we included the iNaturalist records available for the species. Distributional map showing 167 records (Suppl. material 1: Table S2) was done using ARCGIS v10.7 (ESRI) software.

A series of six adult specimens of *Lepidodactylus lugubris* from Easter Island were reported by Donoso-Barros (1966), whose dimensions were (expressed as mean ± standard deviation): HL = 11.42 ± 0.49 mm, SVL = 37.12 ± 2.18 mm, and TL = 37.25 ± 2.04 mm. The dimensions of SUCC-Re 779 from the new locality were as follow: HL = 7.0 mm, SVL = 20.1 mm and, TL = 19.0 mm, suggesting that this was a juvenile specimen. Visits to the collection site were made during the summer of 2019, without finding evidence of more *L. lugubris* specimens.

To our knowledge, this is the first report of *Lepidodactylus lugubris* in mainland Chile, being the southernmost non-insular record in South America for this invasive species (Fig. 2). Our record is ca. 3650 km straight-line distanced from the southern record of the species, which corresponds to Torrez-Carvajal et al. (2019) (Jungle Lodge, El Jardín Alemán, vía Puerto Misahuallí – Puente Pununo, Napo, Ecuador at 01°01'58,68"S, 77°40'9,65"W). Since the native gecko species (*Garthia* and *Phyllodactylus* species) are not present in Santiago city (Chile), several aspects related to our report remain open, especially whether there is a stable population in this urban area. Considering the abundance of hotels and tourism services, along with buildings of ancient architecture, a passive transport of *L. lugubris* specimens could occur during trips to Easter Island from tourists staying at hotels located at the observation site. The presence of another invasive gecko, *Tarentola mauritanica* Linnaeus, 1758, was recently reported in the Región Metropolitana, Chile (Arredondo and Núñez 2014), inhabiting public buildings and places inhabited by humans (Huerta-Vera 2016). Similarly, *L. lugubris* is considered a species with high adaptability, even inhabiting human constructions (Hen-

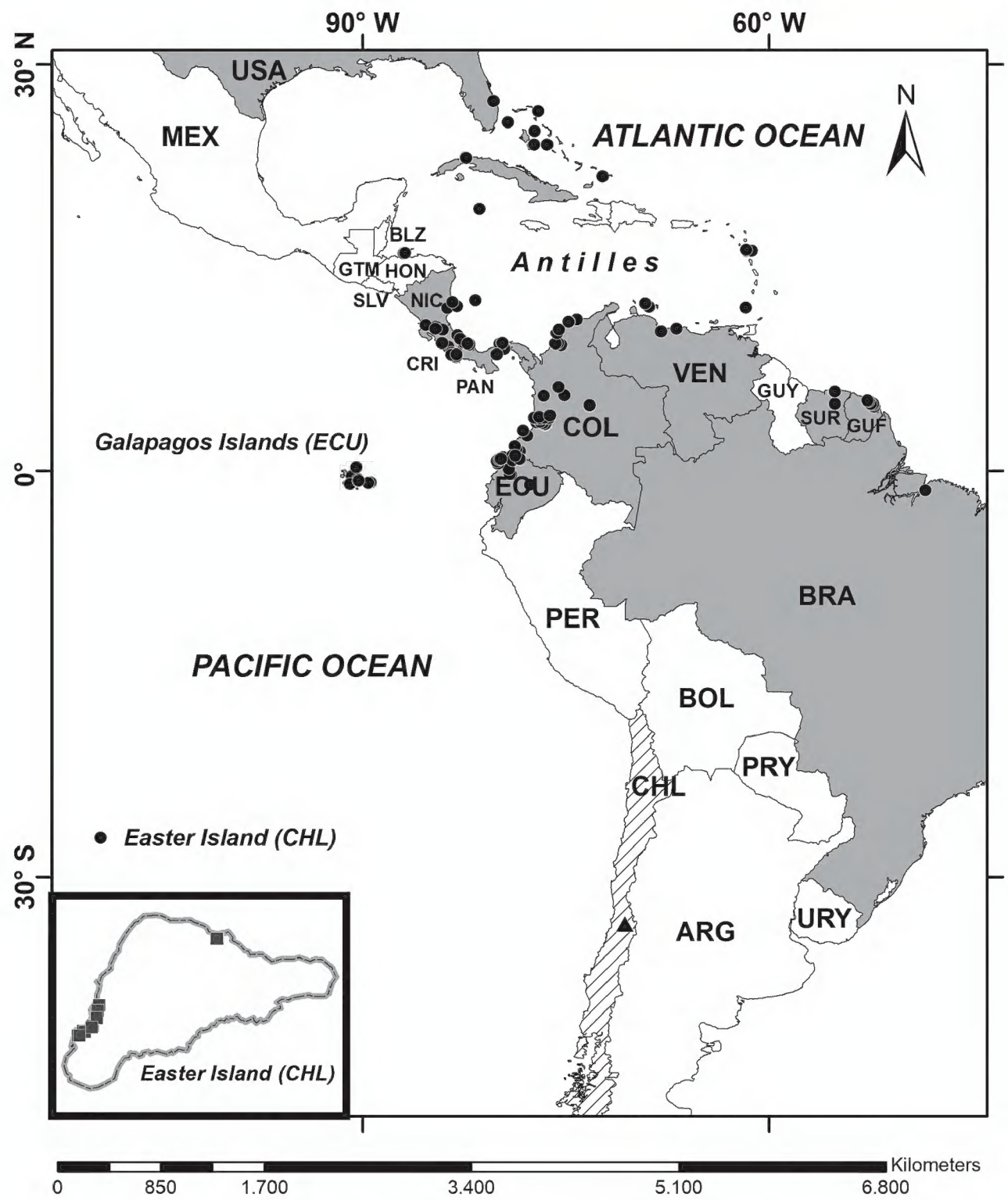

Figure 2. Geographical distribution of *L. lugubris* in America and the Antilles. The map includes literature records (circles), iNaturalist records (squares), and the new locality recorded in mainland Chile (triangle). Grey shading represents its presence in the mainland of the previously reported countries, and in simple hatch fill the new record in mainland Chile. Abbreviations of the countries follow ISO 3166 Alpha-3 code.

derson et al. 1976; Señaris et al. 2017). Further studies are required to confirm a permanent population of *L. lugubris* in mainland Chile, whose presence could have effects not predicted in the native species that inhabit urban areas.

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Supplementary material 1

Tables S1, S2

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Data type: Data of distributional map

Explanation note: GPS data used for elaboration of the distributional map of *L. lugubris*.

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